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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

01/03/00  
U.S. PTO  
JC586  
09/476521

Applicant: Herbert Gropp et al.  
Serial No: Art Unit: 3748  
Filing Date:  
Title: BUILT-UP CAMSHAFT  
Examiner  
Prior Application Examiner: Weilun Lo  
Attorney's Docket Number: RUM212

January 3, 2000

Rum212T1

TRANSMITTAL LETTER

Hon. Commissioner of Patents and Trademarks  
Washington, D.C. 20231

SIR:

Transmitted herewith for filing is:

<X> Request for Filing a Continuation Application under 37 CFR 1.60.  
<X> Photocopy of the Patent Application, serial number 09/016,597, as filed on January 30, 1998 (8 pages, 1 page of Abstract and 1 sheet of drawings)  
<X> Photocopy of the Inventor Declaration as filed in prior Patent Application, Serial No. 09/016,597, on March 30, 1998  
(X) Enclosed is a check to cover the fee in the amount of \$345.00.  
(X) The applicant hereby petitions the Commissioner of Patents and Trademarks to extend the time for response to any Office Action outstanding in the above captioned matter as necessary to avoid abandonment of the application. Please charge my deposit account No.11-0224 in the amount required to cover the cost of the extension. Any deficiency or overpayment should be charged or credited to the above account.  
(X) The Commissioner is hereby authorized to charge any fees under 35 U.S.C. 1.16, and 1.17, after a mailing of a Notice of Allowance under 35 USC 1.18 or any additional fees which may be required during the entire pendency of the application, or credit any overpayment, to Acct. No.11-0224. A duplicate copy of this sheet is enclosed. If and only if account funds should be insufficient, immediately contact our associate, Lisa Zumwalt, at (703)415-0579, who will pay immediately to avoid deprivation of rights.  
( ) Please charge my Deposit Account No.11-0224 in the amount of \$\_\_\_\_\_. A duplicate copy of this sheet is enclosed.  
A signature or signatures required for the above recited document(s) is (are) provided herebelow. Such signature(s) also provide(s) ratification for any required signature appearing to be defective in the above recited document(s).

*Horst M. Kasper*

Horst M. Kasper, 13 Forest Drive, Warren, N.J. 07059  
Reg. No. 28,559 Tel. (908)757-2839

Express Mail Certification:

I hereby certify that this correspondence is being deposited with Express Mail Post Office to Addressee in an envelope addressed to Commissioner of Patents and Trademarks, Washington, D.C. 20231,

on.....*JAN 0 3 2000*....."Express Mail Mailing Label No":*TB173616476US*.....

Signature.....*STAN/LAJ*..... Date.....*JAN 0 3 2000*.....

\*%pt0:trans0(Rum212T1(January 3, 2000(tm



## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Herbert Gropp et al.  
 Serial No:  
 Filing Date:  
 Title: BUILT-UP CAMSHAFT  
 Examiner:  
 Prior Application Examiner: Weilun Lo  
 Attorney's Docket Number: RUM212

Art Unit: 3748

January 3, 2000

RUM212R1

REQUEST FOR FILING A CONTINUATION APPLICATION  
UNDER 37 CFR 1.60

Assistant Commissioner for Patents  
 Washington, D.C. 20231

SIR:

This is a request for filing a

<X> continuation application under 37 CFR 1.60  
 < > divisional application under 37 CFR 1.60

of pending prior Application Number 09/016,597, filed on January 30, 1998, entitled BUILT-UP CAMSHAFT.

1. Enclosed is a copy of the latest inventor - signed prior application, including a copy of the oath or declaration showing the original signature or an indication it was signed. I hereby verify that the papers are a true copy of the latest signed prior application number 09/016,597, and further that all statements made herein of my own knowledge are true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

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TOTAL CLAIMS	5	-	20	=	X	=	\$
INDEPENDENT CLAIMS	1	-	3	=	X	=	\$
MULTIPLE DEPENDENT CLAIMS						=	\$
BASIC FEE						=	\$ 690.00

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TOTAL OF ABOVE CALCULATIONS	=	\$ 690.00
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REDUCTION BY 50% FOR FILING BY SMALL ENTITY	=	\$ 345.00
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TOTAL:	=	\$ 345.00
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2. <X> A verified statement to establish small entity status under 37 CFR 1.9 and 1.27  
< > is enclosed  
<X> was filed in prior application No. 09/016,597 and such status is still proper and desired (37 CFR 1.28(a)).
3. <X> The Commissioner is hereby authorized to charge any additional fees which may be required under 37 CFR 1.16 and 1.17, or credit any overpayment to Deposit Account No.11-0224. A duplicate copy of this sheet is enclosed.
4. <X> A check in the amount of \$345.00 is enclosed.
5. < > Cancel in this application original claims ..... of the prior application before calculating the filing fee. (At least one original independent claim must be retained for filing purposes.)
6. <X> The inventor(s) of the invention being claimed in this application is (are): **Herbert Gropp, Dietmar Klose, Claus-Peter Durlich, Manfred Janssen**
7. < > The application is being filed by less than all the inventors named in the prior application. In accordance with 37 CFR 1.60(b), the Commissioner is requested to delete the name(s) of the following person or persons who are not inventors of the invention being claimed in this application:
8. <X> Amend the specification by inserting before the first line the sentence:  
"This application is a <X> continuation < > division of application number 09/016,597, filed on **January 30, 1998**, now pending."
9. < > New formal drawings are enclosed.
- 10.<X> Priority of a foreign application serial number **197 03 260.3**, filed on **January 30, 1997** in the **Germany** is claimed under 35 U.S.C. 119(a) - (d).  
<X> acknowledgement was made of a claim for foreign under 35 USC § 119(a)-(d) that all of the certified copies of the priority documents have been received; acknowledgement that all of the certified copies of the priority documents have been received was included in the Office Action mailed on October 16, 1998 (paper No. 8) in prior application number 09/016,597, filed **January 30, 1998**.

11.< > A preliminary amendment is enclosed.

12.<X> The prior application is assigned of record to: INDUSTRIA  
FAHRZEUGTECHNIK GMBH & CO. KG, Reel/Frame 9176/0176

13.< > Also enclosed:

- <X> ... ( ) sheets of proposed new drawings Figs. ....
- <X> ....( ) sheets of corrected drawings of Figs.  
where the corrections are marked in red
- <X> ....( ) sheets of the corrected drawings of Figs.  
without the red markings

14.<X> The power of attorney in the prior application is to:

Horst M. Kasper (Reg. No. 28,559)  
Richard T. Laughlin (Reg. No. 17,264)

a.<X>The power of attorney appears in the original papers in  
the prior application.

b.< >Since the power does not appear in the original papers,  
a copy of the power in the prior application is  
enclosed.

c.<X>Address all future correspondence to: (May only be  
completed by applicant, or attorney or agent of record.)

Name, address, telephone: Horst M. Kasper, 13 Forest Drive,  
Warren, N.J.07059, Tel.(908)757-2839.

Attorney's docket Number: MSA212

Attorney's Reg. Number: 28,559

Date: January 3, 2000

Signature



Horst M. Kasper

( ) Inventor(s)

( ) Assignee of complete interest

(X) Attorney or agent of record

( ) Filed under 37 CFR §1.34(a)

Registration number if acting under 37 CFR 3.73(a)

PTO/SB/13(11-96) reqcon(RUM212R1(January 3, 2000(tm/sn

APPLICATION FOR UNITED STATES PATENT

**Inventor(s):**

Herbert Gropp  
Dietmar Klose  
Claus-Peter Dürlich  
Manfred Janssen

**Invention:**

BUILT-UP CAMSHAFT

**Attorney Docket Number:**

rum205

Horst M. Kasper, their attorney  
13 Forest Drive, Warren, N.J. 07059  
Telephone: (908)757-2839  
Telefax: (908)668-5262  
Reg.No. 28559; Docket No.: rum205SP

**SPECIFICATION**

## BUILT-UP CAMSHAFT

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

The present invention relates to a built-up camshaft including a pipe or a solid rod, cams, ring bearings, end pieces, and other parts.

#### 2. Brief Description of the Background of the Invention Including Prior Art

Built-up camshafts are produced today essentially by a partial internal high-pressure deformation of the pipe against the cams, by elevating, raising, and advancing the surface of the pipe and squeezing the cams onto the pipe or by shrink-fitting the cams on the pipe.

The shaping of the cams from the pipe by internal high-pressure deformation is also being considered.

However, all of these production methods are accompanied with substantial disadvantages. The starting materials have to exhibit very low tolerances in regard to dimension and material characteristics and the joining technique is complicated. The internal high-pressure deformation is expensive and produces thin walls at exactly the important tips of the cams.

/ **SUMMARY OF THE INVENTION**

1. Purposes of the Invention

Based on the state of the art, the present invention has the object to build a camshaft with commercially available materials and semifinished materials with a simple technology, wherein said camshaft is manufactured in mass production at an advantageous cost.

These and other objects and advantages of the present invention will become evident from the description which follows.

2. Brief Description of the Invention

The present invention provides for a camshaft according to the characterizing portion of claim 1.

Suitable embodiments of the invention are contained in the subclaims.

The attachment of the cams and of the other parts on the pipe is performed with a longitudinal compression joint. The pipe is coated, preferably with a finely crystalline phosphate coating, as known from the East German printed patent document 015 2972, such that the overdimensioned cams, which are to be slipped, do not score and seize, that the friction tightness is increased, and that no tribocorrosion is generated later on. Following a careful

opening up in an automatic jointing machine, the cams are slid into their positions and, in fact, continuously without a stick-slip effect. The surface of the pipe or of the solid rod is thereby not affected and does not exhibit any scoring or scratches.

It is also possible to precisely carry out the fine positioning to + 0.1 mm longitudinally and +/- 10 angular minutes based on the coating. A pipe, a solid rod, cams and other parts, if they are pressed on longitudinally, require no particularly narrow dimension tolerances and material tolerances, but they can be used of a conventional quality. A torsional resistance of 10 - 20 Nm can be easily reached.

The exact positioning of each individual cam is assured by the longitudinal compression method on a suitably coated surface. Camshafts must also exhibit as a whole very small dimensions such that the two cams, spaced the farthest apart from one another, can exhibit relative to each other also only very low deviations from the ideal position. Therefore, an slight regrinding of the cam track surface is performed. The object is the "jointing and finishing" without regrinding, which has to grow out from and result from the experiences of mass production. This object is achievable with the object of the present invention.

All individual parts to be mounted on the pipe can be completely machined beforehand including the surface hardening.

Instead of the finely crystalline phosphate coating, it is also possible to use other surface coatings, such as metal and cement. In the case of cement, the formation of the front face to be slid on is of importance for the distribution of the adhesive on the pipe or the solid rod.

The coating can be performed on one side or on two sides on the pipe outer bore and/or cam inner bore.

The cams are appropriately formed of light-weight sheet metal construction, such as is for example known from the German printed patent document 196 40 872.5. The cams can however also be made of solid material, plastic or ceramic material. A drawn surface quality is sufficient for the pipe and also for the bearing seats. However, a regrinding of the bearing positions can be required for tolerance reasons.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

In the accompanying drawings, in which are shown several of the various possible embodiments of the present invention:

Fig. 1 is a schematic sectional view through a

camshaft segment;

Fig. 2 is a schematic sectional view through a camshaft end;

Fig. 3 is a view of the entire camshaft on a reduced scale.

#### **DESCRIPTION OF INVENTION AND PREFERRED EMBODIMENT**

The jointing coating 2 between the pipe 1 and the cams 3 of light-weight sheet metal construction is indicated in Fig. 1. However, the jointing coating 2 in fact does not have a measurable radial extension.

In Fig. 2, the pipe has an inner coating 5, such that the end piece 4 can be pressed in.

Fig. 3 shows the entire camshaft, wherein all parts to be disposed on the pipe, are longitudinally pressed onto the camshaft. For simplicity's sake, the cams are represented as disks.

Patent Claims

1. A built-up camshaft comprising  
a pipe or a solid rod,  
cams,  
bearing rings,  
end pieces, and  
other parts, wherein the cams (3), the end pieces (6), the  
bearing rings, and the other parts are connected by means of  
longitudinal compression joints to the pipe or to the solid  
rod, wherein the parts to be connected are provided with a  
suitable surface coating, and wherein the surface coating  
prevents a tribocorrosion and increases the load capacity as  
compared to conventional compression joints.

2. The camshaft according to claim 1, wherein  
the coating (2, 5) is a joint-stable conversion coating.

3. The camshaft according to claim 1, wherein  
the coating (2, 5) is a metal coating or a cement coating.

4. The camshaft according to claim 1, wherein  
the pipe or the solid rod and/or the cams, the end pieces,  
the bearing rings, and the other parts are made out of

metal, ceramics, plastics or other materials, by cutting or non-cutting, by milling or forging in massive or profiled form.

5. The camshaft according to claim 1, wherein the outer jacket face of the pipe or of the solid rod has a drawn quality or is completely or partially mechanically machined.

#### **ABSTRACT OF THE DISCLOSURE**

A pipe or a solid rod (1) is coated on the outer surface, or cams (3) and/or other parts are coated on their inner surface with a suitable coating (2), for example a joint-stable conversion coating, in order to produce a cost-advantageous mass product with commercially available materials and semifinished materials by a longitudinal pressing on of cams and other parts onto the pipe or solid rod.

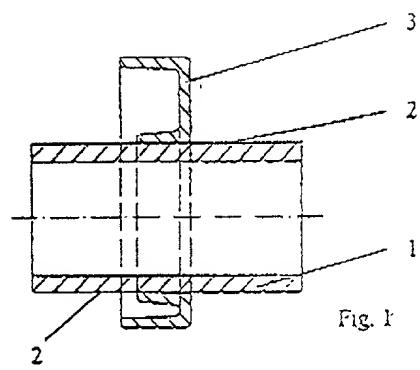


Fig. 1

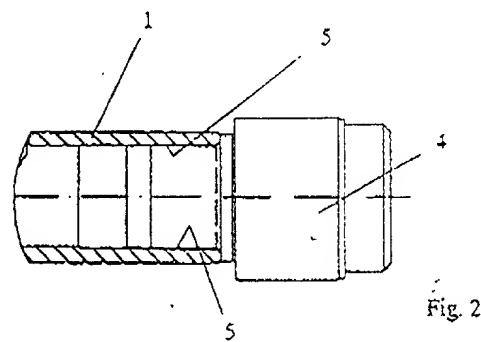


Fig. 2

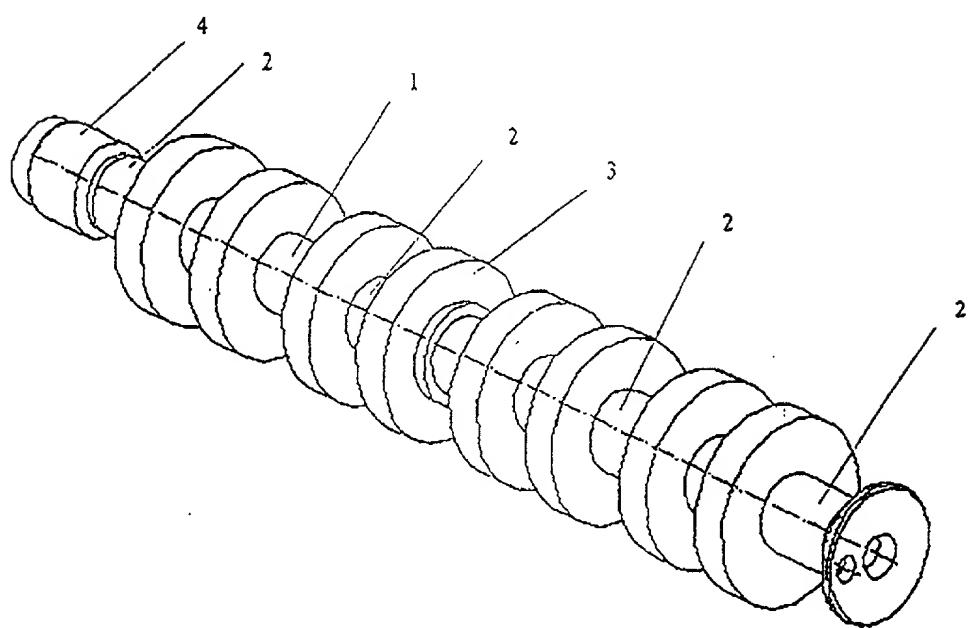


Fig. 3

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Herbert Gropp et al.  
Serial No: Art Unit:  
Filing Date: January 30, 1998  
Title: BUILT-UP CAMSHAFT  
Examiner:

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION  
Erklärung Für Patentanmeldungen Mit Vollmacht  
German Language Declaration rum205

Als nachstehend benannter Erfinder erkläre ich hiermit an  
Eidesstatt:

As a below named inventor, I hereby declare that:

dab mein Wohnsitz, meine Postanschrift und meine Staats-  
angehörigkeit den im Nachstehenden nach meinem Namen aufgeführten  
Angaben entsprechen,

My residence, post office address and citizenship are as stated  
below next to my name,

dab ich, nach bestem Wissen der ursprüngliche, erste und  
alleinige Erfinder (falls nachstehend nur ein Name angegeben ist)  
oder ein ursprünglicher, erster und Miterfinder (falls  
nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin,  
für den dieser Antrag gestellt wird und für den ein Patent  
beantragt wird für die Erfindung mit dem Titel:

Gebaute Nockenwelle

I believe I am the original, first and sole inventor (if only one  
name is listed below) or an original, first and joint inventor  
(if plural names are listed below) of the subject matter which is  
claimed and for which a patent is sought on the invention  
entitled:

BUILT-UP CAMSHAFT

deren Beschreibung (nur eines der nachfolgenden Kästchen  
ankreuzen)

the specification of which (check only one item below)

< > hier beigefügt ist.  
is attached hereto.

<X> am 30. Januar 1998 als U.S.-Anmeldung, Seriennummer .....  
eingereicht wurde und am abgeändert  
wurde (falls tatsächlich abgeändert).  
was filed as US Application Serial No:..... on January  
30, 1998 and was amended on (if applicable).

< > am als internationale PCT-Anmeldung, Nummer  
eingereicht wurde und am unter PCT-Artikel  
19 abgeändert wurde (falls tatsächlich abgeändert).  
was filed as PCT international application, Number on and was  
amended under PCT Article 19 on (if applicable)

Ich bestätige hiermit, daß ich den Inhalt der obigen Patentanmeldung einschließlich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

Ich erkenne meine Pflicht zur Offenbarung jeglicher Informationen an, die zur Prüfung der Patentfähigkeit in Einklang mit Titel 37, Bundesgesetzbuch (Code of Federal Regulation), § 1.56 von Belang sind.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäß Abschnitt 35 der Zivilprozeßordnung der Vereinigten Staaten, Paragraph 119 jeglicher unten angegebenen Auslandsanmeldung(en) für ein Patent oder Erfindersurkunde oder jeglicher internationalen PCT-Anmeldung(en), welche mindestens ein Land ausser den Vereinigten Staaten benennt, und habe auch jegliche Auslandsanmeldung(en) für ein Patent oder Erfindersurkunde oder jegliche internationale PCT-Anmeldung(en), welche mindestens ein Land ausser den Vereinigten Staaten benennt, nachstehend gekennzeichnet, welche von mir für den gleichen Gegenstand eingereicht wurde und ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s)

designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

**PRIOR FOREIGN /PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER  
35 USC 119:**

**FRÜHERE AUSLÄNDISCHE/PCT ANMELDUNG(EN) UND JEGLICHE PRIORITYÄT UNTER  
35 USC 119:**

Country (if PCT, indicate PCT)	Application No.	Date of Filing (day, month, year)	Priority Claimed under 35 USC 119
Land (falls PCT, PCT angeben)	Anmeldungsnummer	Anmeldedatum (Tag, Monat, Jahr)	Priorität unter 35 USC 119 beansprucht
Germany	197 03 260.3	30 January 1997	<X>Yes < >No

Ich beanspruche hiermit gemäß Absatz 35 der Zivilprozeßordnung der Vereinigten Staaten, Paragraph 120, den Vorzug jeglicher unten aufgeführten U.S.-Anmeldung(en) oder die USA benennende internationale(n) PCT-Anmeldung(en) und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in dieser/diesen früheren Patentanmeldung(en) laut dem ersten Paragraphen des Absatzes 35 der Zivilprozeßordnung der Vereinigten Staaten, Paragraph 112 offenbart ist, erkenne ich gemäß Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung(en) und dem nationalen oder internationalen PCT Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 USC 120:

FRÜHERE AMERIKANISCHE ANMELDUNGEN ODER DIE USA BENENNENDE INTERNATIONALE PCT-ANMELDUNGEN FÜR VORRECHT UNTER 35 USC 120

U.S. APPLICATIONS	STATUS (Check one)
U.S. Application No. U.S Filing Date AMERIKANISCHE ANMELDUNGEN	Patented Pending Abandoned
Seriennummer Anmeldedatum	STAND (ein Kästchen ankreuzen)
	Patentiert Anhängig Aufgegeben
	< > < > < >

PCT APPLICATIONS DESIGNATING THE U.S.

PCT Application PCT Filing Date U.S.Ser.Nos.  
Number assigned (if any)

DIE USA BENENNENDE PCT-ANMELDUNGEN  
PCT-Anmelde- PCT-Anmeldedatum Zugeteilte Serien-  
nummer nummern (falls zutreffend)

< > < > < >

**VERTRETUNGSVOLLMACHT:** Als benannter Erfinder beauftrage ich hiermit den nachstehend benannten Patentanwalt (oder die nachstehend benannten Patentanwälte) und/oder Patent-Agenten mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Geschäfte vor dem Patent- und Warenzeichenamt: (Name und Registrationsnummer anführen)

**POWER OF ATTORNEY:** As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (List name and registration number)

Horst M. Kasper (Reg. No. 28,559)  
Richard T. Laughlin (Reg. No. 17,264)

Telefongespräche bitte richten an: (Name und Telefonnummer)  
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Horst M. Kasper (908) 757-2839

**Postanschrift:**

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13 Forest Drive  
Warren, N.J. 07059

Ich erkläre hiermit, daß alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und daß ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, daß wissentlich und vorsätzlich falsche Angaben gemäß Paragraph 1001, Absatz 18 der Zivilprozeßordnung der Vereinigten Staaten von

Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden können, und daß derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Voller Name des einzigen oder ursprünglichen Erfinders:  
Full name of sole or first inventor:

**Herbert Gropp**

Unterschrift des Erfinders  
Inventor's signature

Datum  
Date

*Herbert Gropp*

*March 6, 1998*

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Staatsangehörigkeit  
Citizenship  
Germany

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Germany

Voller Name des zweiten Miterfinders (falls zutreffend)  
Full name of second joint inventor, if any

**Dietmar Klose**

Unterschrift des zweiten Erfinders

Datum

Full name of fourth joint inventor, if any

**Manfred Janssen**

Unterschrift des vierten Erfinders  
Fourth Inventor's signature

.....Manfred Janssen.....

Datum  
Date

March 4, 1998

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Residence  
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Germany

Staatsangehörigkeit  
Citizenship  
Germany

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Germany

PTO 1391 (10-83)  
\*%pt0:germde(rum205(January 30, 1998(tm